

Intermontanus

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NEWS & ANNOUNCEMENTS

NEW PUBLICATIONS

Snakes: Ecology & Behavior, edited by Richard A. Seigel and Joseph T. Collins. This book contains ten chapters about the ecology and behavior of snakes. The cost is \$27.95. See the book review in this issue for more details.

The General Care and Maintenance of Day Geckos, by Sean McKeown. This new book features: over 140 pages of updated information on maintenance, breeding, and vivarium design; covers all known species of day geckos; and over 67 spectacular color photos, plus illustrations, range maps and black and white photos.

You can order the book from the International Gecko Society for \$17.50 (+\$2.50 s/h). P.O. Box 370423, San Diego, CA 92137.

The International Herpetological Symposium, Inc., announces the publication of **Herpetological Natural History**, a peer reviewed journal devoted to all aspects of the natural history of amphibians and reptiles.

The editor seeks original manuscripts that provide new theoretical and/or empirical insights within the broad topics of behavior, ecology, evolution and life history. Both field and laboratory studies are welcome, as are review papers. Papers will be published as either feature articles or notes. A book review section will appear in future issues.

Herpetological Natural History initially will be published semiannually. Authors should expect accepted papers to be published within 6 to 12 months. Manuscripts and requests for information should be directed to: Gordon W. Schuett, Editor, **Herpetological Natural History**, Life Sciences Program, Arizona State University West, P.O. Box 37100, Phoenix, Arizona, 85069-7100, USA.

Subscription to **Herpetological Natural History** is \$20 per year. International surface postage is included; air mail quotes will be provided upon request. Payment by check or money order in U.S. dollars should be made out to International Herpetological Symposium, Inc., and directed to David Hulmes, Treasurer, International Herpetological Symposium, Inc., 361 Van Winkle Avenue, Hawthorne, NJ 07506, USA.

The contents of volume 1(1) are: On the Origin and Utility of **Herpetological Natural History** by Louis W. Porras and Gordon W. Schuett; What's Good about Good Natural History by Harry W. Greene; Habitat Associations of Prairie Rattlesnakes (*Crotalus viridis*) in Wyoming by Douglas G. Brown and David Duvall; The Herpetofauna of the Cayos Cochinos, Honduras by Larry David Wilson and Gustavo A. Cruz Diaz; Overview of the Natural History of the Green Anaconda (*Eunectes murinus*) by Peter D. Strimple; The Snakes from Samuel Hydroelectric Power Plant and Vicinity, Rondônia, Brazil by Nelson Jorge da Silva, Jr; Population Status of the Indian Python (*Python molurus*) on the Indian Subcontinent by Romulus Whitaker; On the Diets of some Arboreal Boids by Robert W. Henderson; Reproduction and Management of the Southeast Asian Spiny Turtle (*Heosemys spinosa*) in Captivity by Dennis W. Herman; Corroborative Evidence for the Lack of Spring-Mating in Certain Populations of Prairie Rattlesnakes (*Crotalus viridis*) by Gordon W. Schuett, Paul A. Buttenhoff and David Duvall; and Announcements.

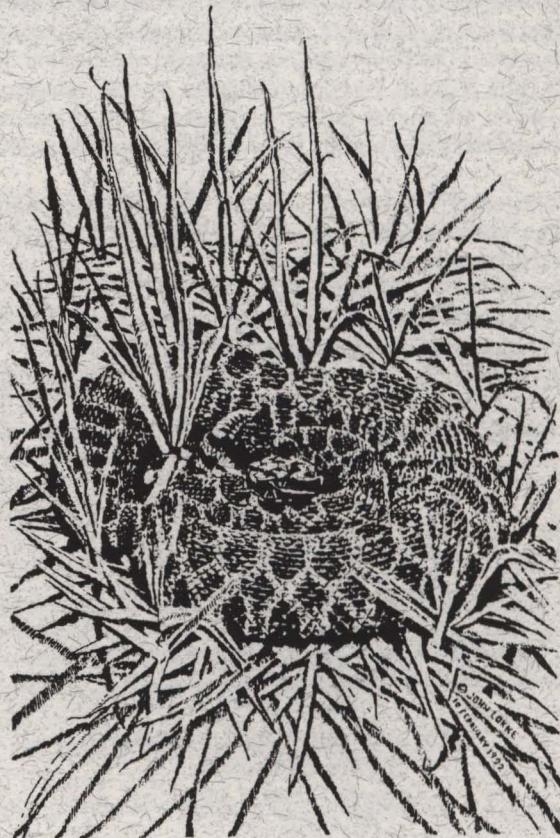
Reptiles is a new magazine geared towards amateur herpetologists. It is similar in content to *The Vivarium*, *Reptile and Amphibian Magazine*, and *Captive Breeding*. **Reptiles** contains nine regular departments: The Editor's Desk; Veterinarian Q & A; Notes From The Field; Herpsstuff; Herpetocultural Queries; Reptile News and Trivia; Ask the Breeder; Classified Ads; and Living With Reptiles as well as several feature articles. The features for the first issue are: Frogs and Toads on Review by Douglas W. Eggleston; Addicted to Lizards by Anne Richards; Setting Up a Dry Land Terrarium by Chris Kelly; Properly Caring for True Chameleons by Richard Bartlett; Lighting Q & A by Anne Richards and Todd Powell; Green Iguanas by David W. Blair; A Family Enterprise by Robert Sands, Sr.; Herbivore Diets by Margaret Wissman, D. V.M. and Bill Parsons; and Mite and Tick Infestations by Douglas R. Mader, M.S., D. V.M., A.B.V.P. and Carl Palazzolo, D.V.M.

Reptiles is published bimonthly. Subscriptions are \$17.97/1 year or \$29.00/2 years. Send subscriptions to **Reptiles**, Subscription Dept., P.O. Box 6040, Mission Viejo, CA 92690-9953

NEW HERPETOLOGICAL ART BY JOHN LOKKE

A new set of note cards featuring the four species of venomous snakes occurring in Nebraska is now available (below is John's illustration of the massasauga). Printed in deep brown ink on heavy, recycled almond-colored stock; a short conservation statement appears on the back side of each card.

The cards are sold in sets of four, one of each design in each set. One set \$6.00 (ppd), three sets \$15.00 (ppd), and six sets \$22.00 (ppd). Send orders to John Lokke, P.O. Box 76, U.N.O., Omaha, NE 68182-0242.



WESTERN DIAMONDBACK RATTLESNAKES BORN AT THE VETERANS HOSPITAL VENOM LAB

On 16 August 1993, a 81 cm western diamondback rattlesnake (*Crotalus atrox*) gave birth to six live and two dead babies. The six live babies ranged from 24-28 cm SVL, 26-31 cm total length, and 11-22.8 g.

FEATURES

INTERESTING HERP OBSERVATIONS AT ZION AND CAPITOL REEF NATIONAL PARKS

One of the many ways national parks monitor animal species is through observation cards. These cards are usually filled out by park personnel, but occasionally visitors contribute interesting sightings also. If you ever find or observe any species in a national park and wish to document your experience, contact a park ranger and ask to fill out a species observation card.

Listed below are some of the many herp observations recorded for Zion and Capitol Reef National Parks. The sightings are listed by category and are generally self explanatory. Comments are added, in square brackets [], to a few of the observations. Note that many of the observations were reported by laymen and species may be mis-identified. Observations from Capitol Reef National Park are marked as such, all others are from Zion National Park.

Breeding:

- 7 May 1974, 2:30 pm, two coachwhip snakes, *Masticophis flagellum*, [This species has never been recorded from Capitol Reef] were seen entwined in the shade of a rock. (Capitol Reef N.P.)

- 29 August 1979, 11:30 am, two Great Basin rattlesnakes, *Crotalus viridis lutosus*. Watchman trail. The two were exhibiting courtship behavior and were observed for about 20 minutes in the shade of a bush, but on the trail. The male trailed over the female's body with his nose and tongue and made short jerking motions. She tried to escape several times, but he would quickly dominate her by encircling and placing much of his weight on her which would then render her docile for a time. The tails were also entwined much of the time.

- 27 May 1985, 8:30 pm. Two ground snakes, *Sonoraa semiannulata*, mating. Two ca. 18" snakes of alternating black & cream bands; with cream bands becoming orange on underbelly. Seen in process of mating.

- 10 June 1991, 11:30 am, Wildcat Canyon. Two mountain kingsnakes, *Lampropeltis pyromelana*, intertwined, crawled under rock when approached.

Feeding:

- 4 September 1941 a sagebrush lizard, *Sceloporus graciosus*, was observed eating a side-blotch lizard, *Uta stansburiana*.

- 21 May 1963, 3:00 pm. Upon investigating frantic squeaks from

a manzanita bush, a three foot long gopher snake, *Pituophis melanoleucus deserticola*, was seen constricting a white-footed mouse. The snake then attempted to swallow the mouse, but released the mouse when pulled out in the open for pictures. Immediately upon reentering the bush, it caught and killed another mouse. While observing this second capture, the observers were attracted by squeaks from another bush and in checking found a larger snake in the process of capturing and killing another mouse.

- 11 August 1972, 6:15 pm, Gateway to the Narrows trail. A wandering gartersnake, *Thamnophis elegans vagrans*, had caught a "Woodhouse's" toad which was still alive. Appeared to have toad by throat. When visitors on walk came to close, snake moved within vine to eat. [It is now clear that Woodhouse toads have never been verified from Zion. The toad was probably a Southwestern toad, *Bufo microscaphus*]

- 22 April 1973, 2:00 pm, Weeping Rock Trail. I observed a snail come wiggling out of a gartersnake's, *Thamnophis elegans vagrans*, mouth. The snail came all the way out & crawled away. The snake did not attempt to get the snail again. The snake crawled away after a few minutes.

- 27 May 1974, 2:00 pm, midget-faded rattlesnake, *Crotalus viridis concolor*, eating a ground squirrel. Snake brought back for observation and identification. (Capitol Reef N.P.)

- 10-13 July 1974, Plateau striped whiptail, *Cnemidophorus velox*. An invasion of flying ants took place on the night of July 9 in the lower canyon. Next day they were found everywhere where lights had been on all night. There were several hundred around the night light behind the visitor's center, and lizards have been feeding on them for the past few days. I have startled as many as 6 Plateau whiptails from their feeding.

- 27 July 1976, Noon, Trail junction to Cable Mountain and Echo Canyon. A desert striped whipsnake, *Masticophis t. taeniatus*, was in the process of eating a lizard. The lizard was either a western skink or a plateau whiptail. All we could see was the back legs & the blue tail.

- 26 September 1976, West rim trail. An adult *Sceloporus* lizard, probably *S. graciosus*, the sagebrush lizard, was observed near Scout Lookout with a young *Sceloporus* lizard in its mouth. About an inch & a half of the hind end of the young lizard still protruded when first observed; the adult moved from an open area to plant cover, where it was watched by one of the hikers in my group, who reported ten minutes later that the adult had almost completely swallowed the young lizard. From the size of the young, it was evidently one of this year's hatchlings.

- 22 August 1981, 10:00 am, Middle Emerald Pools. A striped whipsnake, *Masticophis taeniatus*, about 1.5 feet long attacked an eight inch long plateau striped whiptail, *Cnemidophorus velox*, biting down on the lizard's mid-body. After much writhing and thrashing around the lizard turned and clamped down on the snake. Finally after about a 20 min battle, the lizard died and the snake slithered off with it. [A similar incident was observed on 19 July 1968 at 11:05 am along the Angels Landing trail]

- 12 July 1982, Noon, gopher snake, *Pituophis melanoleucus deserticola*, 20' up tree, ate baby robins in nest. (Capitol Reef N.P.)

- 8:00 pm, 16 July 1982, midget faded rattlesnake, *Crotalus viridis concolor*, observed eating a ground squirrel. (Capitol Reef N.P.)

- 22 August 1982, 5:30 pm, Gateway to the Narrows trail. Wandering gartersnake, *Thamnophis elegans vagrans*, eating a red-spotted toad.

- 11 June 1985, 8:30 am, desert night snake, *Hypsiglena torquata*, ca. 12" long eating a frog (attempted). Positive I.D.

Species records:

[The following two records describe snakes which could be *Tantilla hobartsmithi*. This species has never been recorded in Zion N.P., but they probably occur there]

- 26 July 1970, 9:00 pm, *Thamnophis elegans vagrans*, DOR

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gartersnake lying immediately beside gartersnake was a small snake with a black head similar to night snake. It appeared that the gartersnake had begun to eat the smaller snake. The smaller snake was torn in two, the tail lost, the head collected for identification.

- 17 August 1972, 7:15 pm, Gateway to the Narrows trail. A tan snake ("coachwhip") with a dark head about six inches long was seen.

- 30 July 1991 11:00 am, zebra tail lizard, *Callisaurus draconoides*, "outside of park, in Springdale. [Another *C. draconoides* was found outside the park in 1993. The species has yet to be found within the park boundary]

Miscellaneous:

- At 6:30 pm on 21 July 1991 a gophersnake, *Pituophis melanoleucus deserticola*, following a mouse tried to get into a visitor's motor home. (Capitol Reef N.P.)

- 23 November 1979, 1:00 pm. Gopher snake, *Pituophis melanoleucus deserticola*, Crossing road at south entrance. Length = 4'4". Air temperature 51°F. Previous night's low 28°F. Appeared to have eaten recently; slight bulge approx. 3" in length, 2/3 way down length of body.

Submitted by Breck Bartholomew, 195 West 200 North, Logan UT 84321; Sheri Fedorchak, Resource Management, Zion National Park, Springdale UT 84767; and Sandra Borthwick, Resource Management, Capitol Reef NP, Torrey UT 84775

CLASSIFICATION OF THE BOIDAE

Within the last three years the three subfamilies of the snake family boidae (boas and pythons) have been revised (Kluge 1991; Kluge 1993; Underwood 1990). Each of the three studies analyzed relationships within a single subfamily of the boidae using several morphological characteristics. These studies also recommend changes in the taxonomy within these subfamilies. The taxonomic changes are summarized here.

Underwood and Stimson (1990) examined the subfamily pythoninae. Some herpetologists consider the pythons to represent a separate family, but the data presented by Kluge (below and fig. 1) illustrate that pythons and boas should be in the same family if we want our classification to represent recovered history (i.e.; evolutionary history). Based on their analysis, Underwood and Stimson eliminated the genera *Chondropython* and *Liasis*. Both of these genera are now considered synonymous with *Morelia* (i.e. *Morelia viridis* for the green tree python).

Kluge (1991) revised the subfamily Boinae and concluded that the genus *Xenodon* is the same as *Coralurus* and should be considered as such. He also found that *Sanzinia*, *Acrantophis*, and *Boa* form a monophyletic group. In order to reflect the relationship between these taxa Kluge recommends that *Sanzinia* and *Acrantophis* be considered *Boa*. Initially this causes a problem in that *madagascariensis* is the specific epithet for both of these genera. Therefore *Boa mandrata* becomes the specific name for the Madagascar tree boa and *Boa madagascariensis* is the name of the Madagascar ground boa.

The erycinae snakes are revised by Kluge (1993). One of the most interesting findings in this study is the relationship of the *Calabaria* burrowing python to the other boas and pythons. Many authors consider the *Calabaria* burrowing python a member of the pythoninae, but Kluge finds significant data to place it in the erycinae. In fact, Kluge finds *Calabaria* synonymous with *Charina* (rubber boa). The rosy boa (*Lichanura*) is also found to be synonymous with *Charina*. Finally, the genus *Gongylophis* is found to be paraphyletic with respect to *Eryx* and these two are considered *Eryx* until further study resolves the relationship.

A summary of the relationships within the subfamilies of the boidae can be found in the above studies. Figure 1 illustrates a hypothesis of the relationships of major groups of snakes (see Kluge

1991 for details).

Literature Cited

Kluge, A.G. 1991. Boine snake phylogeny and research cycles. Miscellaneous publications, Museum of Zoology, University of Michigan. (178):1-58.

Kluge, A.G. 1993. *Calabaria* and the phylogeny of erycine snakes. Zoological Journal of the Linnean Society. 107:293-351.

Underwood, G. 1990. A classification of pythons (Serpentes, Pythoninae). Journal of Zoology, London. 221:565-603.

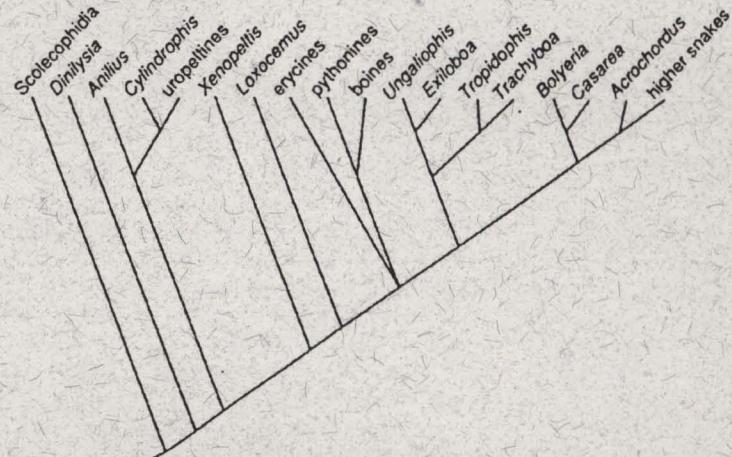


Fig. 1. A preliminary hypothesis of relationships of the major groups of snakes based on 139 characters (Kluge 1990). Notice that the pythons and boas are more closely related to each other than either is to the erycine snakes. Since all three groups share a common ancestor they are considered members of the family boidae. If you choose to recognize pythons as a distinct family then erycines must also be recognized or the classification would not reflect recovered history.

CAPTIVE CARE

HIBERNATING YOUR TURTLE SAFELY

by James Jarchow. Reprinted from The Carapace, December 1989/January 1990, via Notes From NOAH, 20 (11):8-11.

Hibernation is generally recommended for maintaining healthy turtles and tortoises. A regular cycle of complete dormancy is important to the health of these animals for three reasons: hibernation helps them achieve their life expectancies, hibernation helps maintain normal thyroid activity, and hibernation helps synchronize their reproductive cycles. In females, hibernation causes ovulation at a predictable time. In males, hibernation stimulates mating behavior in the spring.

Aquatic Turtles And Hibernation

During hibernation, an aquatic turtle's metabolic rate slows down, he becomes less active, he feeds infrequently, and his need for oxygen is very low. What oxygen is needed is gained through the mucous membranes of the throat and cloaca.

Tropical Species Hibernate Too (Sort Of)

There are a number of tropical species which do not actually go

into a complete state of dormancy. However, they do experience a period of inactivity associated with the dry season in tropical areas. The dry season stimulates a period of torpor that ends with the beginning of the rainy season. This period of torpor may have an important influence on the hormonal metabolism in these animals. For this reason, it is often advisable to allow captive tropical species to go through some period of inactivity.

To stimulate this period of inactivity we reduce light intensity and we reduce feedings. We do not lower temperature. This period of inactivity should last a minimum of six weeks. When the tortoise awakens in the spring he will frequently begin courtship behavior.

It is important for a keeper of tropical species to familiarize himself with the geographic range of the species in his care and with as much of its behavior patterns as possible. The keeper should also discuss the care of his animal with people who have acquired experience in keeping that particular species. Then, and only then, can we hope to provide these animals with the most conducive regime of active periods and periods of dormancy.

A Diet High In Vitamin A Is Essential For Safe Hibernation

Some nutrients become depleted during hibernation. The best known nutrient, vitamin A, is a fat soluble vitamin acquired by turtles through the diet and stored in the body tissues, fat, and liver. Feeding foods high in vitamin A prior to hibernation prevents vitamin A depletion. Grated carrots are recommended for tortoises. Cod liver oil is recommended for box turtles and aquatic turtles. An adult box turtle or a turtle of similar size can be given two drops of cod liver oil twice weekly for one month prior to hibernation. This regimen will ensure the animals have plenty of vitamin A to hold them through the winter.

It Is Important To Stop Feedings Prior To Hibernation

Omnivorous Species: It is important to stop feeding omnivorous species at least ten days prior to hibernation. When turtles go into hibernation with food in the upper part of the digestive system, the food will not digest and will decompose while the animals are hibernating. This decomposition of food is a common cause of death in captive reptiles in general.

Herbivorous Species: Exclusively herbivorous species will usually limit their food intake on their own prior to hibernation. Still, do not tempt them with large amounts of food and do not offer any food at all for one week prior to hibernation. If the animal is outside and has free access to grass—*DON'T WORRY*. Entering hibernation with fibrous plant material in the intestine appears to be normal and may have beneficial effects as well.

Those Which Should Not Be Allowed To Hibernate

Any turtle or tortoise which has not been eating well in the months prior to hibernation should be kept warm, active, and eating. Any turtle or tortoise which is suffering from one or more of the following also should not be allowed to hibernate: Swollen eyes, laborious breathing, or nasal discharge. During hibernation, all body processes (including the immune response system) are turned to low gear. Consequently, turtles do not have the ability to resist infections during hibernation. Animals with infections prior to hibernation must be kept warm, active, and eating until the infections have cleared. Once the infections have been eliminated, the turtle can be allowed to hibernate for a short time.

Never allow an animal to enter hibernation if his eyes appear sunken. Eyes having a sunken appearance are displaying a major sign of dehydration. Dehydration is the result of excessive fluid loss or a physical problem that has resulted in the loss of blood volume or loss of fluid from the cells.

Those Hibernated Indoors

In the wild, terrestrial turtles and tortoises will select humid burrows in which to hibernate, or they will bury themselves in humid soil and leaf litter. This humidity decreases evaporative water loss through the skin and lungs.

Those animals hibernated inside the home (or outside in garages, tool sheds, or in any other unnatural conditions) tend to suffer from dehydration due to low humidity. For this reason, large turtles should be awakened once every four weeks and allowed to soak in shallow room temperature water for two hours to regain fluid they may have lost. Hatchlings and small turtles should be awakened and soaked in shallow room temperature water once every two to three weeks.

What To Look For During Soaks

All turtles should be examined carefully during their soaks. Initially the eyelids will be sealed shut because tears have evaporated and have left behind a thick mucus material. The eyes should open after the animal has been soaking for approximately two hours. If he is healthy the animal should then appear to be about the same as he was during the summer and, once he has had a drink, he will seem interested only in finding his hibernation site again.

If the animal is displaying any problems at all such as: eyes that refuse to open, laborious breathing, nasal discharge, any symptoms of infection, sunken eyes, or serious weight loss—*NEVER ALLOW THE ANIMAL TO REENTER HIBERNATION*.

Those Housed Indoors But Hibernated Outdoors

If a turtle housed indoors is to be hibernated outdoors it is important to gradually acclimate the animal to the lower outdoor temperature over a period of two weeks— minimum. Do not chill a turtle down all at once to 65°F or lower if the turtle has been housed at higher temperatures.

Those animals hibernated outdoors should be provided with plenty of drinking water prior to hibernation. Studies on tortoises have indicated their body water partitioning changes in the fall. This change enables them to store more water in winter than in the summer. Small turtles allowed to hibernate outdoors should be soaked in shallow room temperature water for at least six hours straight for five days in a row prior to hibernation. Large tortoises can be stimulated to drink by turning on a hose and allowing the water to puddle. Clean drinking water should be kept available at all times just in case the animal should awaken briefly during hibernation.

When A Turtle Awakens Frequently

Any hibernating turtle which is awakening frequently may be experiencing problems. Some turtles do this even though they are normal and healthy, but most turtles which awaken frequently do so because they are trying to raise their body temperature to a normal level that will enable them to fight infections, heal injuries, or fight heavy parasite loads. The turtle could also be suffering from malnutrition. Any turtle which awakens frequently should be examined closely and judged healthy before he is allowed to resume hibernation.

Normal vs. Abnormal Weight Loss

A normal healthy tortoise should not lose more than 6 to 7% of his body weight over the winter. I recommend that keepers weigh their tortoise before hibernation and again after hibernation. If total loss is over 7% then the turtle should be examined. Reasons for abnormal weight loss can include infections, heavy parasite loads, injuries that have caused a loss of body fluids, or malnutrition.

BOOK REVIEW

Snakes: Ecology & Behavior, edited by Richard A. Seigel and Joseph T. Collins. 1993. McGraw-Hill, Inc., New York, NY. xvi + 414 pp. Paperback. \$27.95 U.S. ISBN 0-07-056056-0. Library of Congress # QL666.06S65 1993.

This book is the second volume of what, hopefully, will become a series of books about snake biology. The first volume, *Snakes: Ecology and Evolutionary Biology*, was published in 1987. The editors of this book set out with three main goals "(1) to draw together a summary of what is known about the major aspects of snake biology; (2) to summarize the primary literature on snakes, both for the experienced professional who is overwhelmed by the mass of citations available and for the researcher who is just starting to work with these animals; and (3) to stimulate new and innovative research on snakes by drawing attention to those areas of snake biology much in need of additional attention and by making reasonable speculations concerning provocative questions that remain inadequately addressed." Of course it would be impossible to accomplish the first goal in a single volume (or even two volumes), so the editors have chosen nine areas to emphasize.

The ten chapters are: (1) Behavioral and functional ecology of arboreal snakes by Harvey B. Lillywhite and Robert W. Henderson; (2) Sexual dimorphism in snakes by Richard Shine; (3) Foraging theory and prey-size-predator-size relations in snakes by Steven J. Arnold; (4) Perceptual mechanisms and the behavioral ecology of snakes by Neil B. Ford and Gordon M. Burghardt; (5) Ecology and evolution of snake mating systems by David Duvall, Gordon W. Schuett, and Steven J. Arnold; (6) Habitat selection in snakes, by Howard K. Reinert; (7) Snake thermal ecology: the causes and consequences of body-temperature variation by Charles R. Peterson, A. Ralph Gibson, and Michael E. Dorcas; (8) Quantitative genetics of snake populations by Edmund D. Brodie III and Theodore Garland, Jr.; (9) Strategies for snake conservation by C. Kenneth Dodd, Jr.; and (10) Summary: future research on snakes, or how to combat "lizard envy."

Chapters one and two are an excellent start to the book. I found myself unable to put the book down until these chapters were read. The third chapter on foraging theory was fine, but I found it a bit distracting. In discussing the prey-size-predator-size relationship, Arnold presents data from nine snake studies of 16 species. Four of these studies on nine species found that larger snakes did not drop small prey items from their diet; four studies on four species indicated larger snakes do drop small prey from their diet; and one study on three species found one species dropped the small prey items while two did not. Arnold then summarizes these studies by stating, "in summary, as most snake species grow larger they drop small prey from their diets. This deletion trend is apparent in all the studies just reviewed with the exception of" three studies, possibly five studies (p.99). In the chapter summary, Arnold seems to contradict himself again by stating, "Although the number of studies is too few to reveal broad ecological or phylogenetic patterns, several trends stand out. Larger snakes tend to eat larger prey species. More specifically, larger snakes take larger individual prey items, and they often add larger prey species to their diet. The range an variance in prey size also increase with snake size. An enigmatic result is that in many snake species larger individuals drop small prey items from the diet" (p.112). As a reader, I was unconvinced that there is any trend in prey-size-predator-size relationships in snakes. However, despite the distractions, Arnold's review was thorough and thought provoking.

Chapters four, five, and six are all very good. The only problem comes in chapter five's figures. All four of the photographs used in figure 5.6 of male-male combat in copperheads (*Agkistrodon contortrix*) are duplicated in figure 5.7 which illustrates mate choice

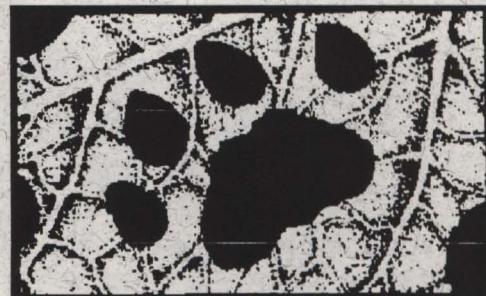
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by male mimicry in a female copperhead. Figure 5.7 also includes two additional photographs of the same snakes. The difference in the number of photographs in the figures may cause the similarity of the figures to go unnoticed by some readers.

The seventh chapter on thermal ecology is also the longest chapter. The organization of this chapter makes it difficult to read. For example, on page 258 the authors describe the methods used in a study by Lutterschmidt and Reinert. A few paragraphs later, in a different subsection, the authors again briefly describe some of the methods of the Lutterschmidt and Reinert paper as well as the results. I found this organization to seem repetitive. Nevertheless, the chapter offers a nice review of snake thermal ecology.

In Chapter eight Brodie and Garland do a good job of making quantitative genetics relatively easy to understand. Dodd updates his 1987 chapter on conservation, in chapter nine, and reviews new information and approaches to the conservation of snakes. Chapter ten is a summary of the book in which Seigel emphasizes the uniqueness of snakes and why we should study them. I found these final three chapters to be very informative and well written.

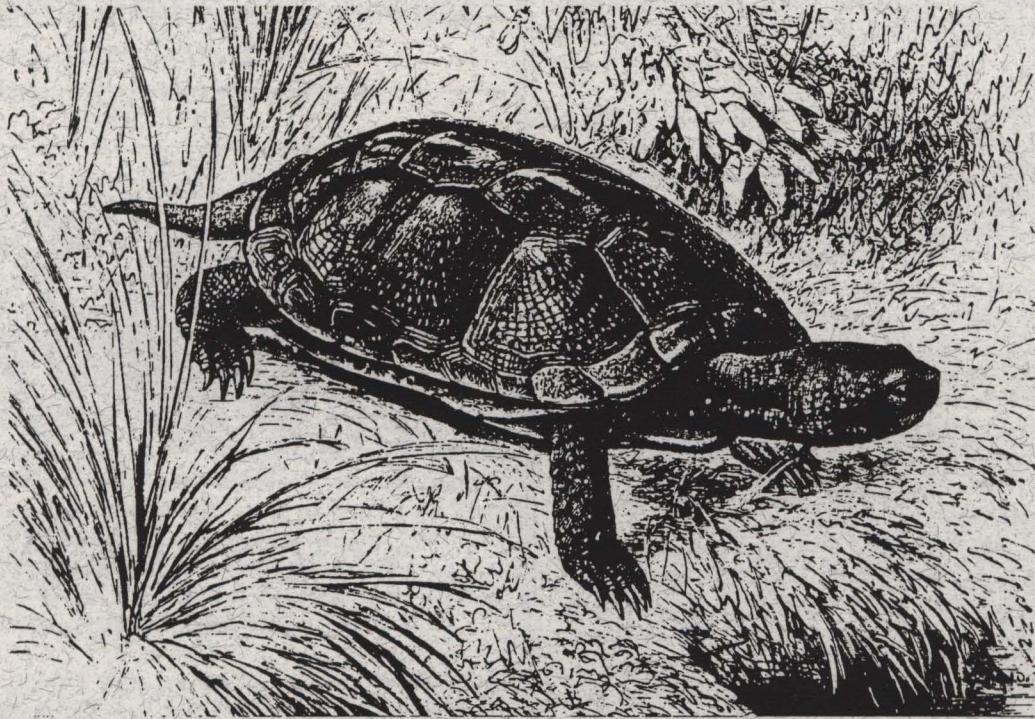
Even though this book is directed towards snake biologists, I believe the chapters are relevant to a variety of biologists. Anyone planning a study in one of the areas covered will benefit from this book. The initial goals have certainly been reached and the editors and contributing authors should be congratulated. Finally, at a price of \$27.95, half that of the first volume, *Snakes: Ecology & Behavior* makes a welcome addition to any herpetological library.

Reviewed by Breck Bartholomew, 195 West 200 North, Logan UT 84321-3905.

UtAH MEETING:

October 5th at Hogle Zoo's auditorium (behind the old elephant house). **Dave Ross**, the State Herpetologist, will talk about some of his work on turtles in the Eastern United States.

Feel free to show up after 7:00 for a pre-talk social. The gate closes at 8:00 sharp, so don't be late. See you there.



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